Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	WT Docket No. 96-86
The Development of Operational,	)	
Technical, and Spectrum Requirements	)	
for Meeting Federal, State and Local	)	
Public Safety Agency Communication	)	
Requirements Through the Year 2010	)	

COMMENTS OF MOTOROLA, INC.

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TABLE OF CONTENTS

SUMMARY

Motorola strongly supports the Commission's efforts to develop policies for meeting the critical communications needs of the nation's public safety agencies through the year 2010. Central to this effort is the work of the Public Safety Wireless Advisory Committee ("PSWAC"), as embodied in its recently issued *Final Report*. The PSWAC *Final Report* provides detailed findings and recommendations on public safety needs based on extensive assessments of users' operational, technical, and spectrum requirements. Now that the *Final Report* is complete, Motorola believes that it is imperative for the Commission to act expeditiously to implement the full range of the PSWAC's key recommendations.

As detailed in Motorola's comments, the PSWAC *Final Report* demonstrates that public safety officers do not have adequate communications resources necessary to discharge their important property and life saving duties in a safe, efficient, and effective manner. The *Final Report* specifically documents how public safety users are hampered by the lack of usable spectrum for existing communications systems, much less for needed advanced services, and the inability to achieve essential interoperability between agencies. The *Final Report* thus concludes, among other things, that almost 100 MHz of new public safety spectrum must be made available by 2010 to meet minimum public safety needs, and that there is a short term requirement of approximately 25 MHz to support voice and data operations. Motorola strongly believes that these key recommendations must be acted upon quickly to ensure that the lives of public safety officers, and the lives and property of the citizens they protect, are not placed in jeopardy.

Motorola's comments also briefly address the inapplicability of Section 273 to the adoption of future public safety standards. Motorola supports and actively encourages user driven standards development in the public safety context, consistent with the PSWAC's position that future baseline digital standards for public safety should be developed and/or adopted in an open and fair process. Moreover, given the procedural guarantees of the Administrative Procedures Act for standards codified by the Commission, there is no necessity, or legal basis, for the Commission to reverse traditional policies and intervene in the public safety industry's efforts to achieve voluntary consensus on technical issues.

In this connection, Motorola's comments also support the Project 25 standards effort to promote competition in the delivery of advanced public safety communications equipment. The user driven Project 25 standards process has been open, inclusive, and designed to ensure a sound technical foundation for advanced public safety communications systems and user interoperability. Indeed, the growing list of manufacturers committed to provide Project 25 compliant equipment already demonstrates the procompetitive benefits of this effort. The Project 25 standard satisfies a wide range of needs identified by the public safety community while enhancing competition among providers of interoperable technologies, thereby complementing the Commission's goals and policies in this proceeding.

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Motorola, Inc. ("Motorola") herewith submits its comments on the above-captioned Notice of Proposed Rulemaking ("*Notice*").[1] In this proceeding, the Commission seeks to develop a comprehensive plan for efficiently and effectively meeting the communications requirements of public safety users through the year 2010. The *Notice*, in large part, parallels the working structure of the Public Safety Wireless Advisory Committee ("PSWAC" or "Advisory Committee"), which was chartered by the FCC and NTIA to examine public safety users' operational, technical, and spectrum needs. The PSWAC's conclusions, embodied in a *Final Report* issued on September 11, 1996, have been made a part of the record in this proceeding.

As discussed below, the PSWAC's *Final Report* represents the most comprehensive and far reaching assessment of public safety needs to date. This report concludes that immediate action is necessary to avert a public safety communications crisis. Now that the

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[1]The Development of Operational, Technical, and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, WT Docket No. 96-86, FCC 96-155 (Apr. 10, 1996).

PSWAC process is complete, Motorola believes it is the Commission's responsibility to act expeditiously on the recommendations of this fact finding forum. Motorola strongly urges the FCC to implement the full package of key recommendations in the *Final Report* and preserve the ability of public safety users to discharge their safety of life and property obligations. Motorola also discusses below the important role of the APCO Project 25 standard in addressing concerns in the *Notice* regarding enhancement of competition in the delivery of public safety communications systems. Further, Motorola addresses the additional comments sought by the Commission regarding the applicability of Section 273(d)(4) of the Communications Act of 1934, as amended, in the adoption of future standards.[2]

I. INTRODUCTION

The nation's public safety agencies are entrusted with the fundamental responsibility of protecting citizens' lives and property. Every day, police officers, fire fighters, emergency medical services personnel, and other public safety officials depend upon their communications technology to respond quickly and effectively. Communications systems must be both reliable and sophisticated to meet the unique challenges facing public safety agencies. In large-scale disasters such as earthquakes, floods, forest fires, or hurricanes, hundreds of agencies and thousands of individuals must come together to provide emergency medical assistance, rescue operations, and infrastructure repair. Day-to-day situations also require effective radio

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[2] Additional Comment Sought on Non-Accredited Standard-Setting Organizations That Develop Standards for Public Safety Wireless Communications Equipment, WT Docket No. 96-86, FCC 96-403 (Oct. 9, 1996).

communications, linking paramedic units to trauma centers and providing on-scene fire officials with essential data. Because of the special nature of their missions, public safety officials have a common requirement for dedicated communications systems that are highly reliable and ensure sufficient capacity on a priority access basis at all times -- allowing communications with agency control centers as well as directly with each other. Individual agencies may also require unique communications capabilities, such as encryption, in specific operating environments and geographic coverage areas.

Today's communications environment, however, impairs the ability of public safety users to fully discharge their responsibilities. There is a lack of sufficient, quality radio spectrum dedicated to Public Service usage. Existing spectrum resources are fragmented and congested, especially in urban areas, making it difficult to meet current needs and impossible to plan for future, more advanced, systems. Furthermore, the ability of different Public Service agencies to communicate with each other is often limited. Interoperability is key to coordinating a rapid and effective response, but is hampered by the use of multiple frequency bands, incompatible radio equipment, and a lack of standardization. These problems diminish the responsiveness and effectiveness of public safety organizations. Ultimately, the safety of the responding officers and of the very individuals seeking their help is compromised by these hindrances in communication.

To address these and other problems, the Federal Communications Commission and the National Telecommunications and Information Administration established the PSWAC to evaluate the wireless communications needs of federal, state and local public safety agencies through the year 2010 and recommend possible solutions. The membership of the PSWAC

encompassed a broad range of public safety agencies (federal, state and local), public service providers, equipment manufacturers, commercial service providers, and the public at large. The PSWAC *Final Report*, released on September 11, 1996, embodies the findings and recommendations developed by the Advisory Committee over the past year.

The *Final Report* concludes that, unless immediate measures are taken to alleviate spectrum shortfalls and promote interoperability, public safety agencies will be unable to fulfill their missions and to protect life and property in a safe, efficient, and cost effective manner. Accordingly, the Commission must implement the key recommendations of the PSWAC *Final Report* to avert a public safety communications crisis.

II. THE PSWAC *FINAL REPORT* REPRESENTS A COMPREHENSIVE, ACCURATE AND DEFINITIVE ASSESSMENT OF PUBLIC SAFETY COMMUNICATIONS REQUIREMENTS

A. Motorola Strongly Supports the PSWAC Process

The establishment of the Advisory Committee provided an unprecedented and long-overdue opportunity for the public safety community to evaluate its communications systems and recommend changes on a national basis. The creation of the PSWAC in June, 1995, followed a long history of efforts by Congress, the FCC, and the NTIA to assess the communications needs of public safety agencies in the context of rapid technological change. Specifically, in response to Congressional concerns voiced in 1995, the FCC and NTIA established the PSWAC to provide advice on the specific wireless communications requirements of public safety agencies through the year 2010 and make recommendations for

meeting those needs. Chartered in accordance with the requirements of the Federal Advisory Committee Act, the PSWAC established five functional subcommittees, each created to address a specific area of concern.

The PSWAC process was consultative and thorough, and served to pull together information and viewpoints from all sectors of the public safety community. The Advisory Committee's membership included senior officials of the nation's largest public safety agencies, representatives of key public safety organizations, and participants from the private sector. Maximum public participation was sought by opening Steering Committee and subcommittee meetings to the public, and by holding these open forums in various locations around the country. In the end, over 480 individuals, representing all areas of the manufacturing, service, and public safety communities, and the general public, participated in the work of the Advisory Committee.

B. The PSWAC *Final Report* Provides an Accurate, Comprehensive, and Definitive Assessment of Public Safety Communication Needs

The culmination of the PSWAC process was the development of a detailed *Final Report*, submitted to the FCC and the NTIA on September 11, 1996. The *Final Report* embodies the views and factual findings of the 5 subcommittees, whose individual reports appear as appendices. In its entirety, the process through which the *Final Report* was developed was thorough, open and well-documented. The *Final Report* establishes a careful map of current capabilities and technology, and also lays out a series of recommended steps

and strategies for action. These recommendations are addressed to federal regulators, public safety agencies at all levels, and the manufacturing sector.

As directed by the Advisory Committee's Charter, the *Final Report* examines the problems confronting the public safety community today, and identifies the wireless communication needs of the community to the year 2010. The *Final Report* also discusses the technologies available to meet those needs, the spectrum and interoperability requirements of the community, and the transition mechanisms that will be required to bring public safety communications up to expected levels of performance, efficiency, and effectiveness. In particular, the PSWAC has offered a number of key findings and recommendations concerning: (i) the shortage of quality spectrum available to public safety users; (ii) the need for coordinated steps to achieve improved interoperability; (iii) the need for more sharing and joint use of spectral and communications resources; (iv) and the use of commercial services.

III. THE COMMISSION MUST IMPLEMENT THE KEY RECOMMENDATIONS OF THE PSWAC REPORT TO AVERT A PUBLIC SAFETY COMMUNICATIONS CRISIS

A. Public Safety Users' Ability to Discharge Their Duties in a Safe, Efficient and Effective Manner is Jeopardized by the Lack of Sufficient Spectrum

The *Final Report* concludes that there currently exists a shortage in spectrum available to public safety agencies and that new capabilities made possible by recent technological advances will only exacerbate the demand for spectrum. While the demand for spectrum allocated to public safety agencies has been increasing rapidly, there have been no nationwide

allocations of new Public Spectrum since the FCC allocated an additional 6 MHz in the 800 MHz band in 1987. The shortage in spectrum has resulted in heavily congested airwaves, especially in urban areas where large numbers of mobile operations compete for the limited available spectrum. Congestion can lead to delays in public safety response, or even to a breakdown in communications in emergency situations. Such problems diminish the effectiveness of police, fire and emergency operations, ultimately jeopardizing the lives of public safety officers and the general public. Furthermore, the *Final Report* notes that congestion will only get worse, under current projected population growth and demographic changes. Thus, the *Final Report* concludes that immediate measures are necessary to avert a potential crisis in communications.

B. Lack of Spectrum Prevents Public Safety Agencies From Implementing Advanced Services Necessary To Save Lives and Preserve Property

Recent advances in communications technology have created a new range of sophisticated capabilities which have the potential to greatly enhance the operations of public safety agencies, and to reduce danger to public safety personnel. These new technologies, both currently in place or in development, include high-speed broadband data systems which offer instant access to a vast range of databases, video systems which promise better surveillance capabilities, robotics for use in toxic and hazardous environments, and systems to assist in better monitoring of both personnel and equipment. Additional spectrum is mandatory in order to exploit these new systems.

C. The Lack of Interoperability Between Public Safety Agencies Must Be Rectified

A major obstacle to effective and efficient public safety communications is inadequate and limited interoperability -- the capability of wireless communication users to interact and exchange information with users from other public safety agencies. It is not uncommon that police officers, firefighters, and emergency medical service personnel working in the same city are unable to communicate with each other when responding to an emergency, due to communications systems that are incompatible -- operating in separate parts of the spectrum or different radio formats. In many cases, the solutions to bridging these gaps are costly and cumbersome, requiring officers in the field to carry multiple mobile radio handsets, or to rely on a central dispatcher to relay messages and vital information.

The *Final Report* recognizes that interoperability is essential to the work of public safety agencies in three important areas. First, interoperability is the key to effective coordination of day-to-day operations, especially where agencies have concurrent jurisdiction, such as city and county police forces. Second, effective communication between various agencies is essential in "mutual aid" situations, such as riots or wildland fires, in which various emergency units must establish on-scene contacts and effective coordination. Finally, interoperability is essential in carrying out task force operations, linking several public safety agencies at local, state and federal levels.

There is no single solution to interoperability problems; rather, interoperability is a goal only achievable by policy action on several fronts. First, interoperability can be enhanced by addressing the fragmentation and scarcity of spectrum. Nationwide, public safety

agencies at all levels use a total of ten radio bands that range from 30 MHz to over 800 MHz. No single commercial grade radio is cable of operating in all of these bands. Setting aside additional spectrum for interoperability purposes is thus necessary to create clear, nationwide channels allocated solely for interoperability. Second, the development and deployment of new equipment -- such as gateways or interfaces between infrastructures -- should be encouraged by the FCC. Third, the enhancement of communications infrastructure is needed, including planning and encouragement of shared systems. The *Final Report* proposes a number of specific solutions to the interoperability problems facing public safety, including both short- and long-term solutions, and solutions which are infrastructure-dependent and infrastructure-independent (direct unit to unit). The *Final Report* also recognizes the requirement for a baseline standard to allow unit to unit interoperability. Motorola supports the Spectrum Requirements Subcommittee Summary of the *Final Report* encouraged the Commission to allocate additional spectrum in bands that are near or adjacent to existing public safety bands to facilitate manufacturing economies of scale -- lower the investment to develop new radio equipment, and increase volume production benefits. Such contiguous placement of new spectrum will also promote interoperability with existing systems that are in adjacent spectrum. Motorola urges the Commission to act on these proposals to ensure the interoperability needs of public safety users are met.

D. Motorola Strongly Urges the Commission To Take All Necessary Measures To Implement the Key Recommendations of the PSWAC, Including Allocating Sufficient Quantities of Additional Spectrum for Public Safety Users

Now that the *Final Report* has been issued, Motorola believes it is the Commission's responsibility to implement expeditiously the full scope of the key recommendations of this fact finding forum. The *Final Report* proposes a range of recommendations, recognizing that no single solution will alone solve the telecommunications problems confronting public safety users. Rather, the package of solutions proposed by the PSWAC acknowledges the breadth of the challenge, and the interrelatedness of the problems that must be overcome. The *Final Report*'s recommendations are consistent with Congress' broad direction to the FCC and NTIA to reduce regulatory burdens on spectrum users, improve efficient spectrum use, encourage competition, and ensure the safety of life and property.[3]

The *Final Report* recognizes that any solution to public safety communication needs must include attention to the shortage of quality spectrum. The currently allocated public safety spectrum is insufficient to meet current voice and data needs, will not permit deployment of needed advanced data and video systems, does not provide adequate interoperability channels, and will not meet future needs under projected population growth and demographic changes. The Spectrum Requirements Subcommittee developed a comprehensive model of spectrum demand, and predicted spectrum usage levels for public safety through the year 2010, using data accumulated across the public safety community.

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[3]47 U.S.C. §§ 332(a) and 903(d)(1).

This estimate demonstrates that, by 2010, almost 100 MHz of new public safety spectrum must be made available to meet minimum public safety needs. The *Final Report* also concluded that there is a short term (within the next five years) requirement for approximately 25 MHz of new spectrum for voice and data operations. Motorola further supports the *Final Report* recommendation that four channels (24 MHz) of the TV channels 60-69 should be reallocated to public safety as soon as possible to address these present shortages. In this regard, Motorola stresses the need for the FCC to identify clearly the additional spectrum assignments well in advance of their availability. Manufacturers must have sufficient notification to design, develop and build new systems and equipment in these new spectrum bands, in time to meet PSWAC recommendations.

The *Final Report* also wisely urges increased federal/non-federal sharing and improved spectrum management. Furthermore, the Advisory Committee highlighted technology advances, such as digital transmission and advanced modulation techniques, which permit users to increase the amount of traffic that can be transmitted over any given amount of spectrum. The *Final Report* correctly concludes, however, that these measures alone would be by no means sufficient to address public safety capacity needs in the near future. Further, these future efficiencies are recognized and factored into the spectrum model referenced above.

The PSWAC acknowledges that achieving the goals outlined in the *Final Report* will require commitment, cooperation and open dialogue among the various user groups, regulating officials and the manufacturing community. Motorola strongly urges the Commission to plan for and allocate spectrum for public safety use, implement the changes needed to the rules

governing non-federal radio usage, and to work to facilitate meeting the other key recommendations of the PSWAC.

IV. THE APPLICABILITY OF THE COMMUNICATIONS ACT OF 1934, AS AMENDED, IN THE ADOPTION OF FUTURE STANDARDS

The PSWAC *Final Report* concludes that digital technology will be the key technology for the future, and that a minimum baseline standard is critical for interoperability. As noted in the *Final Report*, because PSWAC decided to remain technology neutral, their non-recommendation of any specific technology or standards should not be construed as a lack of support for, or rejection of, any available technologies or standards. The Interoperability Subcommittee Summary of the *Final Report* recognizes the need to address digital baseline standards. Specifically, it recommends that a group comprised of experts representing government, industry, and users be organized to further address baseline technology for interoperability. Further, it recommends that such digital baseline standards be open standards, developed and/or adopted in an open and fair process. Motorola fully supports this *Final Report* recommendation.

Motorola concurs with the Commission, however, that Section 273 of the Act is not applicable to organizations developing standards for public safety wireless communications equipment. Motorola believes that the Commission's authority to impose requirements and control the standards setting process depends on whether or not the FCC decides to mandate standards to the public safety community. As detailed in Section V, Motorola actively encourages a user driven standards development process to provide increased interoperability

and promote greater competition. Motorola strongly believes that it is not necessary for the Commission to duplicate industry efforts where users have already gone through the standards setting process.

In any event, while the Commission has clear authority to adopt or develop standards, it is questionable whether such authority extends to dictating procedures or certifications for other organizations to follow in developing standards. In the past, the Commission has allowed industry to work toward voluntary consensus on technical issues and relied upon the procedural guarantees under the Administrative Procedures Act ("APA") to ensure integrity, fairness, and that any standard ultimately adopted was in the public interest. Under the circumstances, there is no apparent need, or legal basis, for the Commission to assert control over the process by which industry achieves consensus.

Motorola agrees with the overall principles of fairness and openness in the development of standards, as presented in Section 273(d)(4). Motorola has and will continue to support an open and inclusive user driven standards development process that permits open participation in a reasonable and non-discriminatory manner, provides open procedures and process requirements, and is based on fairness to all participants. Motorola believes that it is inappropriate, however, for the FCC to impose undue restrictions and procedural requirements on an industry group addressing digital baseline standards before such a group is even formed.

V. THE PROJECT 25 STANDARD WILL PROMOTE COMPETITION IN THE DELIVERY OF ADVANCED PUBLIC SAFETY COMMUNICATIONS EQUIPMENT

In addition to requesting comment on means to ensure that public safety communications needs will be satisfied, the *Notice* also solicits input on what measures could be implemented to enhance competition in the market for public safety communications equipment. As Motorola discusses below, efforts like the APCO/NASTD/FED Project 25 standard ("Project 25 standard") are precisely the type of voluntary, user-driven requirements assessments that will enhance competition in the equipment market.[4] The Project 25 standard was developed through an open process and has already spurred renewed entry into -- and competition in -- the market for Project 25 compatible infrastructure and subscriber equipment.

A. The Project 25 User Driven Standard Setting Process Has Been Open, Inclusive, and Designed To Ensure Interoperability

The Association of Public Safety Communications Officials International, Inc. (APCO), the National Association of State Telecommunications Directors (NASTD), and representatives of federal agencies have led an industry-wide effort for over six years to develop a set of Project 25 standards that will increase radio spectrum efficiency, enhance competition in the public safety equipment and services marketplace, and facilitate interoperability between public safety users.[5] The first phase of Project 25 (called Phase I) was completed in August of 1995.

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[4]The APCO/NASTD/FED Project 25 coalition was formed in January, 1990, and included APCO, NASTD and representatives of federal agencies.

[5]*Notice* at ¶ 98.

Phase I established a frequency division multiple access ("FDMA") digital standard for public safety land mobile radio systems operating on 12.5 kHz channels. References made below to the Project 25 standard pertain specifically to Phase I, unless noted otherwise. Phase II of Project 25 is considering additional standardization requests from the User Needs Task Group. As discussed in detail below, implementation of the Project 25 standard will promote wide-scale interoperability between participating public safety users and will enhance the level of competition among public safety equipment manufacturers.

From its inception, the Project 25 standards setting process has been governed with a baseline purpose of maximizing effective communications among public safety users while ensuring that the marketplace for public safety equipment and services promotes choice and competition. These are the same goals that prompted the Commission to initiate its inquiry in WT Docket No. 96-86. In particular, the Commission has stated that its objective in initiating this proceeding is to "broaden the opportunity for public safety agencies to obtain access to the benefits that accrue from the increased competition and innovation that has emerged in telecommunications generally while maintaining the independence, reliability, universal service, and security that are integral to public safety."[6] In addition, the Commission has outlined several circumstances that it believes will enhance competition in the market for public safety communications systems. These are: (1) policies that will allow for the widest range of services; (2) initial equipment purchases that will not limit choices in upgrade and expansion; (3) innovation that will not require an entirely new system; and (4) acceptance of

[6] *Id.* at ¶ 102.

the competitive environment by manufacturers and service providers.[7] Each of these elements -- choice, flexibility, and a commitment by manufacturers to an open market system -- are characteristics of the Project 25 standard.

The definition of the Project 25 standard was driven by public safety users, with the participation of numerous equipment manufacturers and government representatives. The standard setting process was co-chaired by APCO and NASTD. The Project 25 process included users and suppliers of public safety communications services and representatives of federal agencies. Public safety users have consistently been the driving force in the formulation of the standard itself. For example, the genesis of the entire standard- setting process was a user requirements document developed by the Project 25 User Needs Task Group.[8] That document resulted from the collective effort of representatives of federal, state, and municipal governments, and was premised on the operational needs of public safety agencies.[9] Chief among the needs identified by the User Needs Task Group were spectrum efficiency, interoperability, compatibility, multi-vendor sourcing, migration, voice quality, range, data capability, and encryption.

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[7] *Id.* at ¶ 97.

[8] *See* Joe Gallelli, APCO 25: Are Users the Driving Force? Communications, Vol. 33, No. 1, at 8-11 (Jan. 1996).

[9] *Id.* See also Donna Carlson, What Can Users Expect From Digital and Analog? Communications, Vol. 32, No. 9, at 28-34 (Sept. 1995) ("Project 25 is the first standards development effort in which users have worked with industry to establish a common set of goals. To keep the radio users' needs in line with the development of standards, the Project 25 committee has assigned the . . . User Needs Task Group.").

The Project 25 standard was developed through an inclusive, consultative process, and the specific technological components of the standard were selected on the basis of objective criteria. Participating manufacturers, including Motorola, Ericsson, E.F. Johnson, and more than ten others, submitted detailed technical proposals that were open to scrutiny and challenge by the manufacturing community, as well as other interested parties. These proposals were evaluated against a federal study of digital radio technology, used by Project 25 as a baseline. After a two year effort, the Project 25 Steering Committee, the Project 25 final decision maker, decided on QPSK-C modulation, a digital signaling format, an IMBE vocoder,[10] and Frequency Division Multiple Access ("FDMA") channel access technique[11] -- a combination that was not available in any public safety radios at the time of selection. Significantly, although both newer FDMA and TDMA channel access techniques offer improvements in spectrum efficiency, the users selected FDMA over TDMA because it is better suited to the specific needs of public safety entities in terms of interoperability, compatibility, range, adaptability, and spectral efficiency.[12]

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[10]"IMBE" stands for "Improved Multiband Excitation," developed by Digital Voice Systems, Inc.

[11]In the process of evaluating technologies developed by various participating manufacturers, Motorola's VSELP vocoder technology, which is accepted in the digital cellular radio standard, was rejected. As a result, Motorola was required to make significant modifications to comply with the selected Project 25 standard. Motorola also initially presented FDMA and Time Division Multiple Access ("TDMA") digital radio technologies which were not accepted. *See* Craig Jorgensen & John Powell, Co-Chairs, Setting the Record Straight: A Message to the Public Safety Communications Community, *APCO Bulletin*, Vol. 59, No. 7, at 1-4 (July 1993).

[12]*See* Joe Gallelli, APCO 25: Are Users the Driving Force? Communications, Vol. 33, No. 1, at 8-11 (Jan. 1996). In that article, Mr. Gallelli noted that:

B. The Project 25 Standard Represents a Sound Technical Foundation for Advanced Public Safety Communications Systems and User Interoperability

The Project 25 standard is technologically sound, promotes efficiency and innovative operations, and will facilitate interoperability among public safety users. A principal benefit of the Project 25 standard is the fact that it is backward-compatible with each manufacturer's existing systems. Thus, although the standard itself provides a forward migration path to future systems, it does not jeopardize the sizable existing investments of the user community. In addition, equipment compatible with the Project 25 standard can be employed in conventional systems used by small departments as well as complex wide-area trunked networks used by large users. As such, the standard will facilitate interoperability among public safety entities with varying budgets. Similarly, the Inter Sub System Interface ("ISSI") included in the Project 25 standard allows the interconnection of compliant systems that might be in different radio bands, constructed at different times, or supplied by different vendors. This allows backward compatibility and interoperability with compliant systems offered by a

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> Mutual aid requires units of different public safety services and jurisdictions to meet at the scene of an event requiring cooperation and coordination. . . . Without the aid of infrastructure, one unit should have the ability to communicate directly with another unit at the event. TDMA does not easily support the "talk around" mode without infrastructure intervention for time slot control. The TDMA character need for time slot control also brings to surface another problem that results in "dropping" a channel when the subscriber is momentarily out of coverage.

See also Donna Carlson, What Can Users Expect From Digital and Analog? Communications, Vol. 32, No. 9, at 28-34 (Sept. 1995) ("[M]any involved in Project 25 see FDMA as better suited for the specific needs of public safety.").

variety of different vendors. Also, the Project 25 standard produces an efficiency rate that meets stated FCC and NTIA future spectrum efficiency requirements, and the rate can be achieved regardless of whether the system operates in conventional or trunked mode.

Finally, the Project 25 standard promotes innovation and competition on the part of manufacturers. As discussed below, the Project 25 standard, in conjunction with the Memorandum of Understanding governing the non-discriminatory licensing of intellectual property rights associated with elements of Project 25, will best enhance the competitiveness of the equipment market while ensuring the needs of the public safety users are fully met.

C. Use of the Project 25 Standard Will Offer Entry Opportunities for Additional Equipment Manufacturers

Use of the standard formulated by Project 25 will offer entry opportunities for additional equipment manufacturers. As mentioned earlier, the primary goal of the Project 25 process was to develop an air interface standard that would permit interoperability between the communications systems operated by public safety users and promote competition among manufacturers, ultimately leading to increased choices and lower prices.

A well conceived standard allows users a choice of many interoperable products from various sources, with a wide range of competing features. In turn, the availability of multiple product choices translates into enhanced competition between vendors, producing lower prices. Because competition fosters innovation, creativity and technical improvements, the Project 25 standard defines interfaces that allow for interoperability yet permit vendors to augment the basic feature set with unique features to provide added value. Implementation of the Project

25 standard will bring both of these product and competitive advantages to the market for public safety communications equipment.

The Project 25 standard identifies performance based requirements and solutions that meet those requirements. The standard is not proprietary. It requires participating manufacturers who hold intellectual property rights ("IPR") essential to the standard to license that IPR to other participating manufacturers -- under fair and reasonable terms and conditions. To advance this key licensing component, more than 20 manufacturers involved in the Project 25 project have signed a Memorandum of Understanding ("MOU") on Intellectual Property, in which they have agreed to make their technology that is essential to the standard available to other manufacturers under fair and reasonable terms and conditions. ***As such, no manufacturer will enjoy an exclusive market position under the Project 25 standard.*** Instead, this allows public safety agencies to select among competing products sharing uniform characteristics compliant to the standard.

The Project standard will also open the market to vendors offering peripheral products and services, in addition to allowing for competition in products incorporating the standard technology. Identifying and licensing essential technologies produces a degree of uniformity in the design and capabilities of wireless communications systems used by public safety agencies across the country. This trend toward enhanced compatibility allows vendors to develop and market peripheral products and services nationally, rather than being forced to adjust their products to a patchwork of incompatible systems. At the same time, the presence of the Project 25 standard in no way diminishes the ability of vendors to develop and market